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Procedia Social and Behavioral Sciences 8 (2010) 453–457

Procedia Social and Behavioral Sciences

International Conference on Mathematics Education Research 2010 (ICMER 2010)

The Relationship between Perfectionism Dimensions and Mathematics Performance in Iranian Students

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Abstract

The purpose of this study was to survey the relation between perfectionism dimensions and basic mathematics skills. For this aim, a sample of 300 students(125 females and 175 males) were selected as random between those who are registered for general and basic mathematics course in second semester of 2008 academic year in Islamic Azad University branch Abadan. Frost multidimensional perfectionism scale-brief version was used for perfectionism measurement. This scale is included of subscales as parental perceptions, concerns over mistake, and doubts about actions, organization and personal standards. Pearson correlation coefficient and multiple linear regression analysis are used for analyzing the data. The results of this study indicated positive relation between personal standards perfectionism and basic mathematical skills and a negative relation between doubts about actions perfectionism and basic mathematical skills. These results also demonstrated that in mathematical education, the affective factor of perfectionism should be considered with other affective factor such as mathematical anxiety and attitude toward mathematics.

Keywords: Perfectionism,Frost Perfectionism Scale,Mathematical Education, Mathematical Performance

1. Introduction

Nowadays, in the beginning of third millennium, working with computers, Internet worldwide web, electronic banking deployments, being acquainted with investment in the stock exchange and economic decisions are changed rapidly to become as a part of humans routine life. Acquainting with basic mathematical concepts and numeral skills are needs that considered as success keys in the complicated world of new era. Despite of the great use of mathematics in life and different careers, but mathematical learning problems and weak performance in mathematics between many ordinary people and also those people with university education is considered as a common problem. Educational morality in mathematics subject is one of the most common problems among Iranian students in all educational degrees. The results and findings of Third International Mathematics and Science Study (TIMSS, 2003) emphasized on the weak performance of Iranian students in mathematics field. The result of this study indicated that between 46 participated countries, Iran hold position of 34 in mathematics for third degree of guidance school and

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doi:10.1016/j.sbspro.2010.12.062

between 25 participated countries, it holds the position of 32 for forth primary school mathematics. So, it is necessary to study the reasons for this lack of success between students (university) and determine the variables that could help to improve the mathematics performances of these students (university).

The available researches in mathematics education indicated that there are many factors related to mathematics performance among which affective factor could be noted. Mcleod (1992, p.575) believes that, "affective issues play a central role in mathematics learning and instruction. . . . If research on learning and instruction is to maximize its impact on students and teachers, affective issues need to occupy a more central position in the minds of researchers".

Among those affective factor related to mathematics performance, it could be mention mathematics anxiety and the attitude toward mathematics (Bassant, 1995). These two factors are studied in many researches. In this regard, Green (1990) claims that "mathematics anxiety is an important emotional variable that is related to weak mathematics performance and is evident between a large numbers of people". Ma (1999) realized that "there is a meaningful relation between mathematics anxiety and successful performance", in other words, the relation between mathematics performance and mathematics anxiety is meaningful and high mathematics anxiety is correlated with low score in this subject. Several researches indicated the relation between the positive attitude toward mathematics and performance in mathematics, for example Reynolds and Walberg(1992), showed that the attitude toward mathematics is a variable by which positive academic achievement in mathematics could be expected.

Perfectionism is an affective factor just as anxiety that everybody somehow enjoy of it. Frost, Martin, Lahart and Rosenblat (1990) defined perfectionism as considering high measurement for performance with extreme criticism tendencies to self-evaluation. Frost et al. (1990) perfectionism theory is very considerable, especially for juvenilia and adolescents. At first, they define five dimensions for perfectionism evaluation and then in the first revision in 1993, they introduce a six dimensional perfectionism, the first dimension is about concern over mistakes (CM), "negative reactions to mistakes, a tendency to interpret mistakes as equivalent to failure, and a tendency to believe that one will lose the respect of others following failure". The second dimension is doubts about actions (D), "the tendency to feel that projects are not completed to satisfaction". Parental expectations (PE) are the third dimension "the tendency to believe that one's parents set very high goals and are overly critical". The forth dimension is parental criticism (PC) that is the tendency of parents to engage in consistent, often critical, evaluation of their child, coupled with the child's tendency to place considerable value on these evaluations". Personal standards (PS), is the tendency to set "very high standards and the excessive importance placed on these high standards for self-evaluation". Finally, organization (O) is the last perfectionism dimension that is "the importance of and preference for order".

Frost et al. (1990) perfectionism theory realized that there is a direct relation between concern over mistakes and doubt about actions and depression and negative affective like anxiety, and personal standards and organization dimensions are correlated with positive affective, so these dimensions are reflecting positive perfectionism.

Only a few researches are being done regarding to the relation between academic performance with perfectionism. Brown et al. (1999) realized that there is a positive significant relationship between personal standards subscales of those female students that are registered in psychology and their GPA. Seipel and Apigian (2005) studied perfectionism relation with statistic grade within students of business under graduating. The results indicated the positive significant relation between personal standards subscale and statistics course grade. Despite of their expectation, an inverse significant relation between organization subscale and statistics grade was evident. Unfortunately, the effect of perfectionism in mathematics classes is yet less studied.

Due to the lack of sufficient and suitable studies regard to relation between perfectionism and students mathematical performance, so the purpose of this research is to study the relation between perfectionism and students mathematical performance. Here, the main research question is:
Whether there is any significant relation between perfectionism dimensions and mathematical performance?

2. Methodology

The population in this research is all Islamic Azad University Abadan Branch students that are educating in the second semester of 2008 academic year. The sampling method is cluster-multistage, that samples are selected between hose students who registered in basic and general mathematics grade. The total sample include of 300 students (175 male and 125 female) with age range between 18 to 53 and mean age is 25.88 and standard deviation is 6.69 year.

The measure for students' perfectionism was brief version of Frost multidimensional perfectionism (MPS-B) scale (Cox, 2002). This scale include 22 items, each of them is measured with Likert scale (1 = totally agreed to 5 = totally disagreed). This scale includes of 5 dimensions as parental perception (5 items), organization (4 items), and concern over mistakes (5 items), personal standards (5 items) and finally doubts about action (3 items). The corenbach alpha's reliability coefficients were .054, 0.54, 0.65, 0.63 and 0.61 for parental perceptions, personal standards, organization, and concern over mistakes and doubts about actions subscales respectively.

The basic mathematics skill test was used for students' mathematics performance evaluation that includes of 15 questions of 5 choices (Jhonson & Kuennen, 2006). The number of questions that are answered correctly is considered as a mathematics performance variable.

Data analysis is done in two stages. In the first stage, MPS-B subscales and mathematics performance is studied explanatory and in the second stage, at first the sample relation between perfectionism dimensions and mathematics performance are studied using Pearson's correlation coefficient, so that the research questions could be answered. Then multidimensional regression analysis is used for studying the correlation between perfectionism dimensions with mathematical performance. SPSS- software, version 11.5 is used for data analysis.

3. Findings

Table 1 indicates the descriptive statistics for perfectionism subscales MPS-B and mathematic performance of Islamic Azad University Abadan Branch students. Regarding this table, it is distinguished that average mathematics performance is not appropriate and none of these students are able to answer all 15 questions.

Table 1: Descriptive statistics for perfectionism subscales MPS-B and mathematic performance

Variable	Mean	Standard Deviation	Skew ness	Min	Max
Mathematics Basic Skills	7.02	3.29	-0.27	0	14
parental perceptions	15.16	3.42	0.17	7	25
personal standards	18.57	2.84	-0.21	9	25
organization	16.93	2.26	-.061	11	20
concern over mistakes	13.54	3.84	0.48	5	25
doubts about actions	8.050	2.68	0.30	3	15

Table 2 shows the simple correlation between mathematics performance and each of these perfectionism subscales. As it is evident, there is an inverse significant relation between parental perception perfectionism and mathematics performance($r= -0.116$ and $P<0.05$). The relation between mathematics performance and concern over mistakes perfectionism is also inversely significant ($r= -0.145$ and $P<0.05$). Here, again there is an inverse significant relation between mathematics performance and doubts about actions perfectionism($r=-0.192$ and $P<0.01$). So, increasing perfectionism in each subscale as parental perceptions, doubts about actions, concern over mistakes is along with weak mathematics performance. There is not any significant relation between mathematics performance and organization perfectionism subscale($r=0.014$ and $P>0.05$). The relation between mathematics performance and personal standards perfectionism is significant positive($r=0.131$ and $P<0.05$). Thus, increase in personal standards perfectionism is along with increasing mathematics performance.

Table 2: Correlation between MPS-B subscales and Mathematics Performance

scale	mathematic performance	doubts about actions	concern over mistakes	personal standards	organization
parental perceptions	-0.116	0.403	0.429	0.132	0.06
organization	-0.014	-0.198	-0.115	0.292	
personal standards	0.131	0.095	0.219		
concern over mistakes	-0.145	0.454			
doubts about actions	-0.192				

As some of perfectionism dimensions are correlated, so it is necessary to consider their effects on each other during correlation analysis. Multiple linear regression analysis is being used to determine multi-relations between perfectionism dimensions and mathematics performance and also predicting mathematics performance with perfectionism dimensions. Table 3 indicates the variance analysis between mathematics performance criterion variable and perfectionism subscales are predicting variables. Due to F statistics, it could be said that there is a relation between mathematics performance and linear combination of perfectionism subscales. Also, it could be claimed that this relation is linear ($F=4.108$, $P<0.01$).

Table 3: ANOVA for linear relationship between MPS-B subscales and mathematics performance

Source	Total	d.f	MS	F	Sig.
Regression	210.986	5	42.197	4.108	0.001
Residual	3019.851	294	10.272		
Total	3230.837	299			

Table 4 lists the share of each multidimensional perfectionism scale-brief version (MPS-B) in predicting mathematics performance of Islamic Azad University Abadan Branch students. The value of multiple correlation coefficient is about $R = 0.256$ and coefficient of determination is $R^2= 0.056$, in other words, with perfectionism subscales only %6.5 of mathematics performance variation could be determined. Regarding these tables, the coefficient of personal standards subscales ($B = 0.191$ and $P<0.01$) and doubts about actions ($B = -0.205$ and $P<0.05$) are predicting mathematics performance significant. As regarding to standardized coefficient, it could be claimed that personal standards subscales and doubts about actions are related to students mathematics performance, while they effect of other perfectionism subscales is omitted.

Table 4: Regression coefficients for MPS-B subscales on mathematics performance

	un standardised coefficients		standardised coefficients		
predictors	B	Standard Error	Beta	T	Sig.
constant	8.57	1.842	-	4.65	0.000
parental perceptions	-0.02	0.063	-0.021	-0.313	0.754
organization	-0.114	0.090	-0.078	-1.269	0.206
personal standards	0.191	0.071	0.166	2.703	0.007
concern over mistakes	-0.09	0.058	-0.106	-1.552	0.122
doubts about actions	-0.205	0.082	-0.167	-2.489	0.013

4. Conclusion

The purpose of this study is to determine the relation between perfectionism and mathematics performance of Islamic Azad University Abadan Branch students. Past researches showed that personal standards dimension is as positive dimensions of perfectionism. So, it is expected to have a positive relation with mathematics performance of students. Data analysis with multiple linear regression analysis indicated a positive relation between perfectionism

in personal standards and student mathematics performance, that is in concordance with Seipel and Apigian (2005) (2005) findings, regarding students performance in statistics class and also Brown et al. (1999) about university performance. Personal standards are tendency toward adopting high measures and putting great importance on them in self-evaluation (Frost et al., 1990). Considering high targets and adopting high standards in comparing with others performance and also expecting higher performance in routine task, all are descriptive characteristics of this perfectionism dimension. Therefore this dimension of perfectionism in showing a positive relation with academic achievements in subjects like statistics mathematics and also university performance. The relation between positive perfectionism dimension in organization and students mathematics performance is not significant. Among those negative perfectionism dimensions, the relation between mathematics performance and parental perception and fear of mistake is not significant and a negative relation between mathematics performance and doubts about actions is evident. Doubts about actions is a tendency to feel that measures and works do not accomplished successfully(Frost et al. 1990).People who enjoy more of this perfectionism dimensions, even though they are doing their job correctly, but doubted about it correctness. They are always doubtful and that is why they have to repeat their works more and more and usually have a very slow performance. The test in this research for evaluating student's mathematics performance includes of five choices questions. Regarding to the perfectionism characteristics of doubts about actions dimension, it seems that multi-choices tests lead to weaker mathematics performance; this finding may be extended and validated to other subjects.

Considering students emotional characteristics and nurturing their positive emotions is one of the most important role of education department, because emotional characteristics play a very important role in personality growth and also academic achievement within learners. Although nurture and evaluation of students' emotion are so important, but no considerable task is expected for teachers and other trainers in this regard (Seif, 2007). Due to these research findings and also the relation between some if perfectionism dimension with mathematics skills and performance, it is suggested that mathematics teachers consider the role of perfectionism in education this subject. Emphasize on positive dimensions such as personal standards and try to create rational beliefs about action could be efficient in academic and mathematics performance.

It is also necessary to study the relation between perfectionism and its species with mathematics anxiety, teaching methods, learning style. It is suggested to review the relation between perfectionism and mathematics performance in the next study and modify mathematics anxiety variables and attitude toward mathematics.

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